

## MARK SCHEME for the May/June 2008 question paper

### **0653 COMBINED SCIENCE**

**0653/02**

Paper 2 (Core Theory), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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- 1 (a) C;  
A;  
F C G;  
B;
- (b) (i) reacts with/joins with oxygen; [1]  
*(allow any correct definition of oxidation)*
- (ii) blue/purple  
*(reject blue/black)*  
(metal oxides produce) alkaline (solutions);  
orange/red/pink/other obvious red shades;  
(non-metal oxides produce) acidic (solutions); [4]  
*(mark colours and reasons separately)*
- (iii) neutralisation; [1]
- [Total: 10]**

- 2 (a) (i) B;
- (ii) E;
- (iii) A/B; [3]
- (b) (i) diffusion; [1]
- (ii) less surface area;  
idea of less contact between air and blood;  
less diffusion; [max 2]
- (c) (i) no nucleus;  
biconcave/detailed description of shape; [max 1]
- (ii) haemoglobin; [1]
- (d) respiration;  
for energy;  
for oxidation of glucose; [max 2]
- [Total: 10]**

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- 3 (a) (i) kinetic/motion/movement energy;
- (ii) (gravitational) potential energy;
- (b) (i) A – B (constant) acceleration/speeding up; [3]  
 B – C constant speed;  
 C – D (constant) deceleration/slowing down;
- (ii) 2.4 m/s (allow 2.3 to 2.5 inclusive); [1]
- (c) (average speed =) distance/time; [2]  
 = 6/3 = 2.0 m/s;
- (d) (i) 60 N; [1]
- (ii) work done = force x distance; [2]  
 = 60 x 0.5;  
 30 J;

[Total: 11]

- 4 (a) (i) fractional distillation/fractionation; [1]
- (ii) different boiling points/intermolecular attractive forces; [1]
- (b) (i) (kerosene) + oxygen → carbon dioxide + water; (LHS RHS) [2]
- (ii) lamp/room/air becomes warm; [1]  
*(allow any reasonable statement which shows that exothermic means heat is given out)*
- (c) nucleus labelled/clearly indicated; [2]  
 electrons arranged 2,4;

[Total: 7]

- 5 (a) decreased; [2]  
 faster at first/more slowly later;
- (b) burning fuels; [2]  
 at power stations;
- (c) reduce vehicle journeys; [1]  
*(allow any reasonable action which could be taken by the industry itself without compromising profitability/production levels)*

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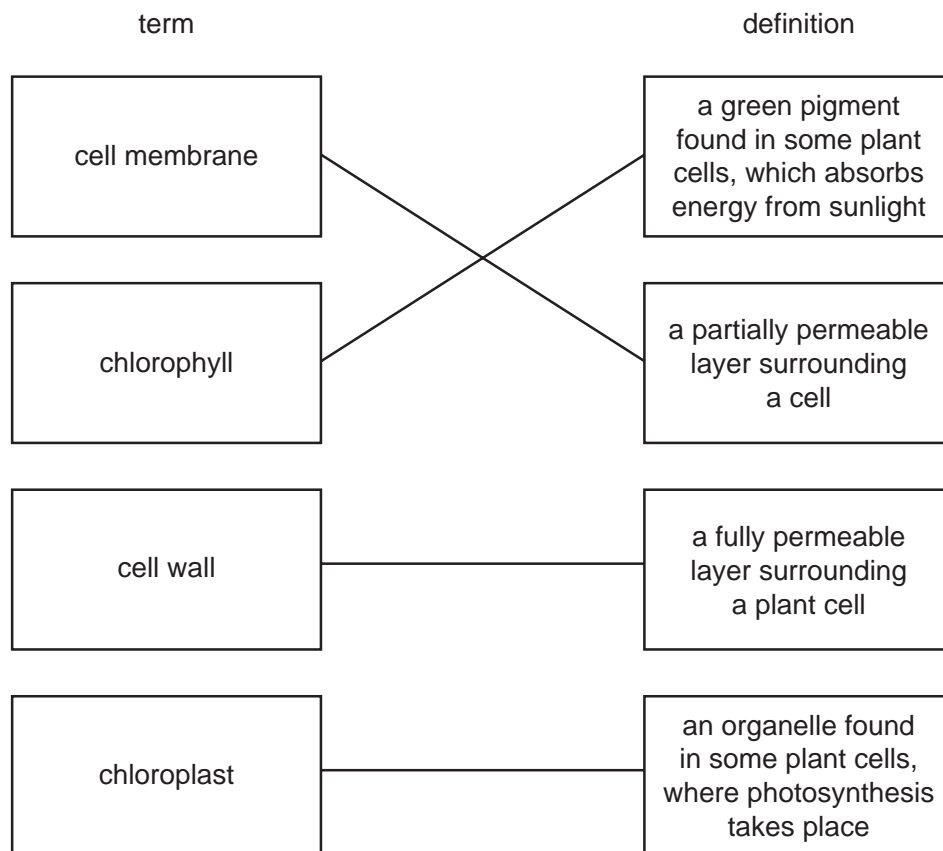
- (d) ref to greenhouse gas/greenhouse effect;  
global warming;  
ref to a possible effect of global warming, e.g. flooding; [m
- (e) high species diversity;  
if we lose rainforests many species lose their habitats;  
species may become extinct;  
need to preserve possible future sources of beneficial natural products; [max 2]

**[Total: 9]**

- 6 (a) (i) electromagnetic; [1]
- (ii) reflection; [1]
- (b) (i) correct connections;  
correct symbols: [2]
- (ii) current/electrical energy can still pass through other lamps/owtte;  
(*reject because it is a parallel circuit*) [1]
- (c) 22 cm;  
any appropriate working; [2]  
(*allow error carried forward*)

**[Total: 7]**

7 (a)



all correct 3 marks  
 two or three correct 2 marks  
 one correct 1 mark

[3]

(b) carbon dioxide combined with water;  
 using (energy from) light;  
 producing, glucose/sugar, and oxygen;  
 starch produced from glucose;  
 many glucoses linked together/polymer of glucose;

[max 2]

(c) (i) asexual;

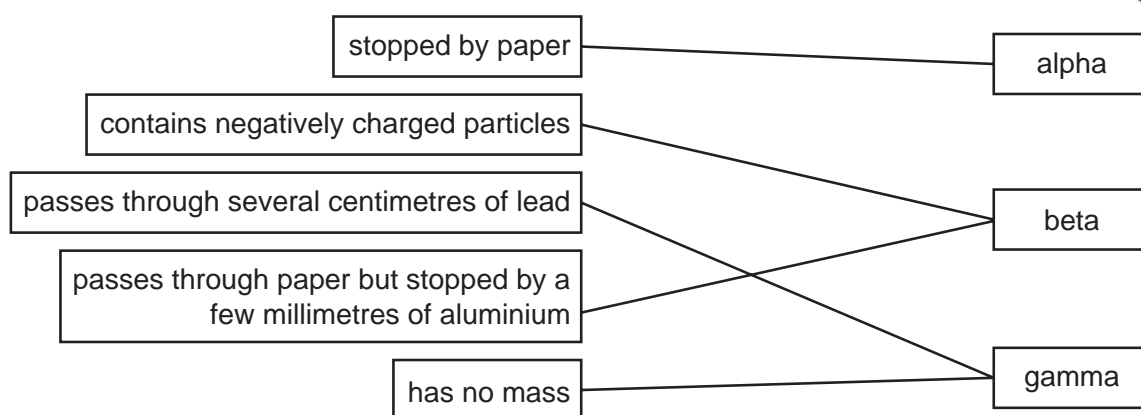
[1]

(ii) identical;  
*(reject similar)*  
 genetically identical/same number and type of chromosomes;

[2]

[Total: 8]

8 (a)



5 correct for maximum of 3 marks  
 3 or 4 correct for 2 marks  
 1 or 2 correct for 1 mark

[3]

(b) (i) ionising/destroys cells;

[1]

(ii) use;  
 e.g. measuring thickness/looking for leaks in pipework/  
 smoke detectors/carbon dating/cancer treatment  
*(reject power generation/making bombs)*

[1]

(c) (i) radiation from natural sources/owtte;

[1]

(ii) cosmic radiation/rocks/other reasonable sources

[1]

(iii) 1160 cpm;

[1]

**[Total: 8]**

9 (a) (i) copper oxide + hydrogen → copper + water;  
*(allow formulae if correct in all details)*

[1]

(ii) reference to:  
 colour change to brown/orange/electrical conductivity of product;

[1]

(b) (i) copper sulphate;

[1]

(ii) copper does not react/dissolve/copper does not pass through filter;  
 soluble copper compound do pass through filter/owtte;

[max 2]

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- (c) (i) ionic;
- (ii) reference to attractive force between opposite charges;  
correct detail e.g. copper (ions) positive and oxide (ions) negative;

- (d) at positive – bubbles of gas/chlorine produced;  
(*reject references to chloride*)  
at negative – orange/pink layer/copper produced;

[2]

[Total: 10]